MEDICINE (GENERAL COURSES)

INTRODUCTION

All Medical graduate programs require the study of one or more of the following courses offered by the **Department of Community Medicine and Behavioral Sciences**.

0510-501	Biostatistics and Computer in Medicine	(2)
0510-502	Advanced Biostatistics	(1)
0510-503	Epidemiology	(1)
0510-504	Radiotracer Methodology in Biological Research	(2)
0510-601	Biostatistical Method in Medical Research	(3)
0510-602	Epidemiology of Infectious Diseases	(3)

COURSE DESCRIPTION

0510-501: BIOSTATISTICS AND COMPUTER IN MEDICINE
CR: 2

This is a 2 credit hour faculty-required course intended for students joining the graduate M.Sc. program in the Faculty of Medicine, Kuwait University. The course takes into account the fact that enrolled students belong to various backgrounds and hence it includes a diversity of topics to meet their interest. The course is characterized by the inclusion of statistical methods in epidemiology (relative risk, odds ratio to measure the association between diseases and factors, evaluation of diagnostic tests), determination of size of investigations and power, analysis of variance, and design of controlled randomized clinical trials. It also includes multivariate statistical methods such as multiple linear regression and binary multivariable logistic regression. It focuses on concepts, limitations, validity and assumptions underlying these statistical methods.

The course also provides students with knowledge about hardware and software computer technology in addition to addition to the skills of applying the procedures of the SPSS statistical package, and information about computer uses in medicine (hospital information system, drug information system and computer-assisted diagnoses).

0510-502: ADVANCED BIOSTATISTICS
CR: 1

Planning of statistical investigation. Controlled comparative studies: Clinical and simple comparative trials, two period cross over design. Analysis of variance. Experimental design. The control of misclassification error. Survivorship tables and life tables. Biological assays: Parallel-line, slope ratio and quantal response. Non-parametric statistics: One-sample run test, Mann-whitney test, Kruskal-Wallis analysis of variance, and Kendall rank correlation.

0510-503: EPIDEMIOLOGY
CR: 1

Scope of epidemiology, basic measures of frequency, sources of morbidity data, direct and indirect standardization. Planning of an epidemiological investigation, survey planning, variability of measurements, validation and problems in validation, measurement of experimental error, population screening and disease control.

0510-504: RADIOTRACER METHODOLOGY IN BIOLOGICAL RESEARCH
CR: 2

This course provides an introduction to the principles and procedures underlying the use of radioactive isotopes in biological research. The material will be presented at a level requiring only elementary mathematics and the principles and procedures will be illustrated with practical examples drawn from actual laboratory work. The course begins with the materials, and detection and measurement of radiation, and progresses to discussions and illustrations of the applications and problems of radiation measurement and experimental design in biology and medicine and methods used for reduction of radiation exposure. Hazards associated with the use of radioactive material will be discussed. Topics which will be given special emphasis include Gamma and Beta counting of biological samples autoradiography, radiochromatography, use in life science and clinical research, and radiation safety measures.

0510-601: BIOSTATISTICAL METHODS IN MEDICAL RESEARCH
CR: 3 PR: 0510-501 or its equivalent.

The course primarily aims at equipping students with tools of research. This includes univariate statistical methods update, sampling methods and sample size, experimental design, multivariate analysis, logistic regression, survival analysis: clinical trials, statistical methods in epidemiology, analysis of matched data and nonparametric statistics. Mann-Whitney, Wilcoxon paired test, Kruskal-Wallis and Spearman rank correlation.

0510-602: EPIDEMIOLOGY OF INFECTIOUS DISEASES
CR: 3

Concepts and definitions, eipdemiological models, causality, epidemic process, indices of health and disease, natural history of infectious diseases, contact patterns, measuring infectivity, methods and techniques for studying an infection in the community, time and place clustering, use of routinely collected data, special surveys, surveillance of infectioue diseases, field investigation, analysis of an outbreak, seroepidemiology, the effect of bias, confounding and misclassification on the identification of source/reservoir of infection and mode of transmission, statistical techniques often used in infectious disease epidemiology, mathematical models for epidemics, primary and secondary prevention in the infectious disease epidemiology, epidemiology of vacation, control, elimination and eradication, epidemiology of emerging infections and epidemiology of specific infectious diseases.

MEDICINE (FACULTY BASED COURSES)

INTRODUCTION

All medicine graduate programs may require from their students to study the following Faculty Based Courses. These courses may be considered compulsory for some programs and electives for the others.

0500-501	Basic Molecular Biology	(1)
0500-502	Basic Immunology	(1)
0500-503	Research Communication I	(1)
0500-504	Research Communication II	(1)

COURSE DESCRIPTION

0500-501: BASIC MOLECULAR BIOLOGY
CR: 1

Nucleic acid structure and functions; DNA analysis by agarose gel and DNA sequencing; DNA Replication: Mechanism, Regulation, Differences between prokaryotic and eukaryotic process; DNA damage, repair and mutagenesis, and diseases associated with defective repair; Transcription mechanisms and processing of primary RNA; The genetic code, protein synthesis and regulation; Restriction and modification enzymes and their importance in molecular biology.

0500-502: BASIC IMMUNOLOGY
CR: 1

Introduction to immunity, Innate and acquired immunity, Organs and cells of the immune system, the Major Histocompatibility Complex and its role in antigen presentation, Humoral immunity, antibodies and complement, Cell-mediated immune function T cells and macrophages, Cytokines and their roles in immune responses, Transplantation immunology, immunoprophylaxis and immunotherapy, Autoimmunity and autoimmune diseases, Hypersensitivity

500-503: RESEARH COMMUNICATION I
CR: 1

The aim of this course is to improve the student's ability to locate and retrieve information in the library, take effective notes, recognize and manipulate biomedical word roots and affixes of classical origin, write scientific English and communicate effectively in seminars. The course has the following components, which are designated to achieve this aim: Library skills, biomedical terminology, basic information structure, processing and seminar skills.

0500-504: RESEARH COMMUNICATION II
CR: 1

This course has its emphasis on improving the student's ability to collect and organize relevant information, and then communicate that information effectively for research reporting purposes, whether as a written report or a seminar presentation. The timing of the course is contrived to oblique the student to present his thesis back ground and methods in a seminar.

Doctor of Philosophy in Medical Science Pharmacology
Program code: 055071

INTRODUCTION

The Department of Pharmacology & Toxicology (Faculty of Medicine) offers a Ph.D. program in Medical **Pharmacology**. The aim of this program is to train pharmacologists that will be capable of carrying out independent basic research in areas of their choice, and to acquire, critically analyze and interpret scientific data in order to prepare them for a career in teaching and research.

PROGRAM REQUIREMENTS

33 TOTAL COURSE CREDITS

8 COURSE CREDITS IN THE MAJOR SPECIALIZATION

0550-600	Selected Topics in Pharmacology	(2)
0550-601	Advanced Neuropharmacology	(2)
0550-602	Advanced Adrenergic Receptor Pharmacology	(2)
0550-603	Advanced Endocrine Pharmacology	(2)
0550-604	Advanced Immunopharmacology	(2)
0550-605	Advanced Pharmacokinetics	(2)
0550-606	Advanced Cardiovascular Pharmacology	(2)
0550-607	Seminars in Pharmacology I	(1)
0550-608	Seminars in Pharmacology II	(1)
0550-609	Seminars in Pharmacology III	(1)
0550-610	Advanced G Protein-Coupled Receptor Pharmacology	(2)
0550-611	Advanced Pharmacogenetics	(2)
0550-612	Research Methodology I	(3)
0550-613	Research Methodology II	(3)

7 COURSE OUTSIDE THE MAJOR SPECIALIZATION

0510-502	Advanced Biostatistics	(1)
0510-601	Biostatistical Methods in Medical Microbiology	(3)
0520-504	Immunity and Infection	(2)
0530-561	Cardiovascular Physiology	(3)
0540-562	Molecular Biology and Biotechnology	(2)
0570-501	Biology of Diseases	(3)
0570-506	Immuno-Pathology	(2)
2000-501	Scientific Writing and Communication Skills	(3)
2000-503	Ethics and Professionalism	(2)

18 COMPULSORY COURSES

0550-697 Dissertation (0)
0550-698 Dissertation (0)
0550-699 Dissertation (18)

COURSE DESCRIPTION

0550-600: SELECTED TOPICS IN PHARMACOLOGY
CR: 2

This course is aimed at entry level graduate students with little or no background in pharmacology. The objective of the course is to introduce the basic principles and terminology of different branches of pharmacology (e.g. pharmacokinetics, pharmacodynamics and toxicology) to allow the student to comprehend current research in the area.

0550-601: ADVANCED NEUROPHARMACOLOGY
CR: 2

This course will cover relevant work that has been done (old& recent) in the neuropharmacology of pain transmission, with special reference to Neuropathic Pain from different causes (disease, trauma etc.). The major areas to be covered will include: excitatory amino acids, neuropeptides, inhibitory amino acids, opioids, cannabinoids, serotonin & noradrenaline and their receptors (types, distribution etc). Sodium, potassium and calcium channels (types, distribution) and the drugs/compounds that act on each will also be discussed. Animal models of Neuropathic Pain & different techniques to assess nociception will also be included.

0550-602: ADVANCED ADRENERGIC RECEPTOR PHARMACOLOGY
CR: 2

This course will cover recent developments in α and β adrenergic receptor pharmacology. Topics to be covered will include detailed subclassification, distribution and localization of these receptors in tissues, molecular biology of adrenergic receptors including use of knock-out technology to study adrenergic functions in health and diseases, signal transduction pathways, desensitization inverse and biased agonism. The role of constitutive receptor activation in disease will also be covered. (Pre-requisite: PHTX 5xx).

0550-603: ADVANCED ENDOCRINE PHARMACOLOGY
CR: 2

Structure activity relationship of hormones. Hypothalamic pituitary hormones and analogs. Thyroid disorders and drugs that affect thyroid gland. Adrenocortical hormones and drugs that affect the adrenal cortex. Ovarian hormones, oral contraceptives and antiestrogen. Testicular hormones, anabolic steroids and antiandrogens. Diabetes mellitus, pancreatic hormones and oral hypoglycaemic agents. Peptide and steroid hormone receptors and Signaling Mechanisms. Novel approaches for producing and administering hormones (Pre-requisite: PHTX 501).

0550-604: ADVANCED IMMUNOPHARMACOLOGY
CR: 2

In this course, emphasis will be on antigen presentation and induction of the immune response, control of IgE synthesis, cytokines and anti-cytokine antibodies, therapeutic potentials of monoclonal antibodies, signal transductions and control of mediator release from inflammatory cells, molecular mechanism of anti-allergic and anti-inflammatory action of steroids, intercellular adhesion molecules, immunosuppresors and immunomodulators.

0550-605: ADVANCED PHARMACOKINETICS
CR: 2

Review of basic concepts, physico-chemical properties and physiological factors related to drug absorption and disposition. Pharmacokinetics of conventional dosage forms, modified-release drug products and targeted drug-delivery systems, hepatic and renal drug clearance, nonlinear pharmacokinetics and its significance to drug therapy, applications of pharmacokinetics in clinical situations such as: dosage adjustment, relationship between pharmacokinetics and pharmacologic response, modifications of

pharmacokinetic parameters in disease states.

0550-606: ADVANCED CARDIOVASCULAR PHARMACOLOGY
CR: 2

An advanced inter-disciplinary course studying the integrative aspects of the anatomy, physiology and pharmacology of the cardiovascular system at the tissue, organ and system level. Topics will include control of the circulation, structure-function of the heart and blood vessels, characteristics and treatments of pathological conditions. Course topics are selected to reflect activities in on-going cardiovascular research and cardiovascular drug investigation and development, with particular emphasis on the use of drugs to dissect physiological and pathophysiological processes, and to discover and validate novel targets for pharmacological exploitation in the management of cardiovascular diseases.

(3) SEMINARS IN PHARMACOLOGY
0550-607 CR: 1
0550-608 CR: 1
0550-609 CR: 1

There will be 3 courses. In each course, the student will be assigned a topic relevant to his/her area of specialization. The student will be required to critically review relevant literature and present it to the department.

0550-610: ADVANCED G PROTEIN-COUPLED RECEPTOR PHARMACOLOGY
CR: 2

This course will cover recent developments in G Protein-Coupled Receptor (GPCR) pharmacology including sequence analysis, structure, activation, signal transduction, desensitization and the nature of agonist, inverse agonist and biased agonist action. The role of constitutive activation in disease will also be covered.

0550-611: ADVANCED PHARMACOGENETICS
CR: 2

This course will focus on the application of genetics and genomics to the development of safe and effective drugs. It will examine the genetic basis of variability in drug efficacy and toxicity. It will include the study of genetic polymorphisms in drug targets, drug transporters and drug metabolizing enzymes and how these factors influence drug pharmacokinetics and pharmacodynamics.

0550-612: RESEARCH METHODOLOGY I
CR:3

0550-613: RESEARCH METHODOLOGY II
CR:3

0550-697: DISSERTATION
CR: 0

0550-698: DISSERTATION
CR: 0

0550-699: DISSERTATION
CR: 18